16. The method of claim 13 wherein the silicon oxide layer is etched at a temperature within a range of about -20°C to about 80°C.

17. The method of claim 13 wherein the silicon oxide layer is etched at a pressure within a range of about 5 mtorr to about 1 torr.

18. The method of claim 13 further comprising applying an electric field to the fluorocarbon gas mixture.

19. The method of claim 18 wherein the electric field is a radio frequency (RF) power.

20. The method of claim 19 wherein the RF power is within a range of about 1 watt/cm^2 to about 100 watts/cm^2.

REMARKS

This is intended as a full and complete response to the Final Office Action dated February 14, 2003, having a shortened statutory period for response set to expire on May 14, 2003. Claims 1-20 are pending in this application. Claims 1-20 were considered and stand rejected. Applicants believe that no new matter has been introduced in this response.

Claims 1-20 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Flanner et al.* (U.S. Patent 6,410,437) in view of *Twu et al.* (U.S. Patent 6,417,106) and *Nakane et al.* (U.S.Patent 4,104,745).

The Examiner asserts that it would have been obvious to one of ordinary skill in the art to incorporate the etch stop material of *Twu et al.* in the damascene forming process of *Flanner et al.* The Examiner also asserts that it would have been obvious to one of ordinary skill in the art to incorporate the silicon oxide etching process of *Nakane et al.* in the damascene forming process of *Flanner et al.* Applicants respectfully traverse this rejection.

Flanner et al. discloses a two step etching process for first etching through a trench dielectric, a trench stop layer, and almost completely through a via dielectric with a low selectivity etchant, and then etching the remainder of the via dielectric with a high selectivity etchant. The low selectivity etchant comprises argon, nitrogen, a hydrogen-free fluorocarbon, and optionally, oxygen. The high selectivity etchants comprise argon, nitrogen, and a hydrogen-free fluorocarbon. (*See,* Col. 5, line 51, to Col. 6, line 15.) *Flanner et al.* also discloses etching a barrier layer 14 using an etchant of argon, trifluoromethane, and tetrafluoromethane. (*See,* Col. 6, lines 60-65.) *Flanner et al.* does not disclose etching an organosilicate layer on a silicon oxide layer with a hydrogen-containing fluorocarbon gas mixture.

Twu et al. discloses an etch stop layer disposed between a substrate and a dielectric layer with the etch stop layer comprising silicon oxide, silicon oxynitride, or silicon nitride. *Twu et al.* does not disclose an etching process of a dielectric material used in conjunction with the etch stop material. *Nakane et al.* discloses a composition for ultra-fine pattern formation using resists comprising at least one of acrylic and/or vinyl ketone polymers with an aromatic azide compound or an organic compound having a vinyl group. *Nakane et al.* also discloses plasma etching an underlying dielectric material of silicon oxide, silicon nitride, or polysilicon, with a mixed gas of CF_4 and O_2 after oxygen development of a resist pattern disposed thereon. *Nakane et al.* does not disclose etching organosilicate layers or any process for etching organosilicate layers. There is no suggestion or motivation in *Nakane et al.* and *Twu et al.* to modify the process of *Flanner et al.*

In contrast, the invention provides an etching gas of hydrogen-containing fluorocarbon gas mixture for etching an organosilicate layer, which etching gas is selected for use with silicon oxide as an etch stop layer.

Flanner et al., Nakane et al., Twu et al., either alone or in combination, do not teach, show, or suggest forming a silicon oxide layer, forming an organosilicate layer on the silicon oxide layer, and etching the second organosilicate layer to define vias therein, wherein the second organosilicate layer is etched with a hydrogen-containing fluorocarbon gas mixture, as recited in claim 1, and claims dependent thereon. Therefore, withdrawal of the rejection is respectfully requested.

The prior art made of record is noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary references cited in the office action. Therefore, it is believed that a detailed discussion of the secondary references is not deemed necessary for a full and complete response to this office action. Accordingly, allowance of the claims is respectfully requested.

In conclusion, the references cited by the Examiner, neither alone nor in combination, teach, show, or suggest the method or apparatus of the present invention. Having addressed all issues set out in the office action, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,

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